

## CLAIMS

1. In a multidimensional digital frame structure, a method for variably programming the bit error rate of frame synchronization bytes, the method comprising:

5 receiving a frame with an overhead section having a predetermined number of bytes; and

selecting the bit error rate for bytes in the overhead section.

*which bytes low*

2. The method of claim 1 wherein the overhead section  
10 includes frame synchronization bytes; and  
wherein selecting the bit error rate for bytes in the overhead section includes selecting the bit error rate for the frame synchronization bytes.

15 3. The method of claim 2 wherein selecting the bit error rate of the frame synchronization bytes includes selecting an average bit error rate.

4. The method of claim 3 wherein receiving a frame  
20 includes receiving an overhead section including a first plurality of frame synchronization bytes; and  
wherein selecting an average bit error rate includes selecting an average bit rate for the first plurality of frame synchronization bytes in each frame.

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5. The method of claim 3 wherein receiving a frame includes receiving a plurality of frames in a superframe; and wherein selecting an average bit error rate includes selecting an average bit error rate for the frame synchronization bytes across a span of a superframe.

6. The method of claim 3 wherein receiving a frame includes receiving a plurality of frames in a plurality of superframes; and wherein selecting an average bit error rate includes selecting an average bit error rate for the frame synchronization bytes across a span of a plurality of superframes.

7. The method of claim 2 further comprising: supplying a bit error rate selection byte with a second plurality of bits; and wherein selecting the bit error rate of the frame synchronization bytes includes selecting a bit error rate responsive to the bit error rate selection byte, in the range from zero to the second plurality of bit values.

8. The method of claim 2 wherein selecting the bit error rate of the frame synchronization bytes includes independently selecting a bit error rate for each frame synchronization byte.

9. The method of claim 2 wherein selecting the bit error rate for the frame synchronization bytes includes selecting a first error rate and a second error rate.

5 10. The method of claim 9 wherein selecting the bit error rate for the frame synchronization bytes includes selecting a first error rate in a first frame and a second error rate in a second frame.

10 11. The method of claim 2 further comprising:  
selecting the byte value of the frame synchronization bytes in the overhead section.

12. The method of claim 11 wherein selecting the value of the frame synchronization bytes includes selecting a second plurality of  
15 bits for each frame synchronization byte.

13. The method of claim 12 wherein selecting the value of frame synchronization bytes includes selecting a plurality of frame synchronization byte values; and  
20 wherein selecting the bit error rate of the frame synchronization bytes includes selecting a bit error rate for each of the plurality of frame synchronization values.

14. The method of claim 12 wherein selecting the value of  
25 frame synchronization bytes includes selecting a plurality of frame synchronization byte values; and

wherein selecting the bit error rate of the frame synchronization bytes includes selecting an average bit error rate for the plurality of frame synchronization values.

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(15.) The method of claim 2 further comprising:  
selecting the quantity of frame synchronization bytes in the overhead section.

16. The method of claim 15 wherein selecting the bit error rate of the frame synchronization bytes includes selecting an average bit error rate for the selected number of frame synchronization bytes.

17. The method of claim 15 wherein selecting the quantity of bytes in the overhead section includes selecting a plurality of frame synchronization bytes; and

wherein selecting the bit error rate of the frame synchronization bytes includes selecting a plurality of bit error rates.

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(18.) The method of claim 2 further comprising:  
selecting the location of the frame synchronization bytes in the overhead section.

19. The method of claim 18 wherein selecting the bit error rate of the frame synchronization bytes includes selecting an average bit error rate for the selected frame synchronization byte locations.

20. The method of claim 18 wherein selecting the bit error rate of the frame synchronization bytes includes selecting a bit error rate for each frame synchronization byte location.

5 21. A method for variably programming the bit error rate of frame synchronization bytes in the communication of a multidimensional digital frame structure, the method comprising:

sending a frame with frame synchronization bytes in the overhead section;

10 receiving the frame;

selecting the bit error rate required for the recognition of a frame synchronization bytes in the received frame; and

synchronizing the received frame in response to recognizing the frame synchronization bytes.

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22. The method of claim 21 wherein selecting the bit error rate includes selecting an average bit error rate.

23. The method of claim 21 wherein synchronizing the received frame in response to recognizing the frame synchronization byte values includes recognizing frame synchronization bytes having a bit error rate less than, or equal to, the selected bit error rate.

24. The method of claim 23 further comprising:  
25 selecting the number of consecutive frames that must be recognized; and

wherein synchronizing the received frame includes synchronizing the received frame in response recognizing frame synchronization bytes having a bit error rate less than, or equal to, the selected bit error rate in the selected number of consecutive frames.

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25. The method of claim 23 wherein sending a frame includes sending a plurality of frames in a superframe; and

wherein selecting a bit error rate includes selecting an average bit error rate for the frame synchronization bytes across a span of a superframe.

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26. The method of claim 23 wherein sending a frame includes sending a first frame and a second frame; and

wherein selecting the bit error rate includes selecting a first error rate in a first frame and a second error rate in a second frame.

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27. The method of claim 21 further comprising:  
selecting the byte value of the frame synchronization bytes in the received frame.

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28. The method of claim 27 wherein selecting the byte value of frame synchronization bytes includes selecting a plurality of frame synchronization byte values; and

wherein selecting the bit error rate of the frame synchronization bytes includes selecting an average bit error rate for the plurality of frame synchronization values.

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29. The method of claim 21 further comprising:  
selecting the quantity of frame synchronization bytes in the  
received frame.

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30. The method of claim 29 wherein selecting the bit error  
rate of the frame synchronization bytes includes selecting an average bit  
error rate for the selected number of frame synchronization bytes.

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31. The method of claim 21 further comprising:  
selecting the location of the frame synchronization bytes in  
the received frame overhead section.

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32. The method of claim 31 wherein selecting the bit error  
rate of the frame synchronization bytes includes selecting an average bit  
error rate for the selected frame synchronization byte locations.

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33. The method of claim 21 further comprising:  
selecting the number of received frames in which frame  
synchronization bytes are not recognized; and  
falling out of synchronization in response to the selected  
number of received frames in which frame synchronization bytes are not  
recognized.

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34. The method of claim 33 wherein selecting the number of received frames in which frame synchronization bytes are not recognized includes selecting the number of frames in which the frame synchronization bytes have a bit error rate greater than the selected bit error rate.

35. In a multidimensional digital frame structure, a receiver system for variably programming the bit error rate of frame synchronization bytes, the system comprising:

10 a frame receiver including an overhead receiver to receive the overhead section of a frame, a payload receiver to receive the payload section of the frame, and a decoder to provide a forward error corrected (FEC) frame; and

15 wherein the overhead receiver includes an input to select the bit error rate of frame synchronization bytes in the overhead section of a received frame.

36. The system of claim 35 wherein the overhead section selects an average bit error rate.

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37. The system of claim 36 wherein the frame receiver receives a frame with an overhead section including a first plurality of frame synchronization bytes; and

25 wherein the overhead receiver selects an average bit rate for the first plurality of frame synchronization bytes in each frame.



38. The system of claim 36 wherein the frame receiver receives a plurality of frames in a superframe; and

wherein the overhead receiver selects an average bit error rate for the frame synchronization bytes across a span of a superframe.

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39. The system of claim 36 wherein receiving a frame includes receiving a plurality of frames in a plurality of superframes; and

wherein the overhead receiver selects an average bit error rate for the frame synchronization bytes across a span of a plurality of

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superframes.

40. The system of claim 35 wherein the overhead receiver accepts bit error rate selection commands through a bit error rate selection byte with a second plurality of bits, and wherein the overhead receiver selects a bit error rate responsive to the bit error rate selection

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byte, in the range from zero to the second plurality of bit values.

41. The system of claim 35 wherein the overhead receiver independently selects a bit error rate for each frame synchronization byte.

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42. The system of claim 35 wherein the overhead receiver selects a first error rate and a second error rate.

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43. The system of claim 42 wherein the frame receiver receives a first frame and a second frame; and

wherein the overhead receiver selects a first error rate in a first frame and a second error rate in a second frame.

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44. The system of claim 35 wherein the overhead receiver selects the byte value of the frame synchronization bytes in the overhead section.

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45. The system of claim 44 wherein the overhead receiver selects a plurality of frame synchronization byte values, and a bit error rate for each of the plurality of frame synchronization values.

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46. The system of claim 44 wherein the overhead receiver selects a plurality of frame synchronization byte values, and an average bit error rate for the plurality of frame synchronization values.

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47. The system of claim 35 wherein the overhead receiver selects the number of frame synchronization bytes in the overhead section.

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48. The system of claim 47 wherein the overhead receiver selects an average bit error rate for the selected number of frame synchronization bytes.

49. The system of claim 47 wherein the overhead receiver selects a plurality of frame synchronization bytes, and a corresponding plurality of bit error rates.

5 50. The system of claim 35 wherein the overhead receiver selects the location of the frame synchronization bytes in the overhead section.

10 51. The system of claim 50 wherein the overhead receiver selects an average bit error rate for the selected frame synchronization byte locations.

15 52. The system of claim 50 wherein the overhead receiver selects a bit error rate for each frame synchronization byte location.

20 53. The system of claim 35 wherein the overhead receiver has an input to accept commands selecting the number of consecutive frames that must be recognized, and synchronizes the received frame in response to recognizing frame synchronization bytes having a bit error rate less than, or equal to, the selected bit error rate in the selected number of consecutive frames.

25 54. The system of claim 35 wherein the overhead receiver has an input to accept commands selecting the number of received frames in which frame synchronization bytes are not recognized, and falling out

of synchronization in response to the selected the number of received frames in which frame synchronization bytes are not recognized.

55. A system for variably programming the bit error rate
- 5 of frame synchronization bytes in the communication of a multidimensional digital frame structure, the system comprising:
- a transmitter with a frame generator including an overhead generator having an input to accept commands for selecting frame synchronization bytes in the overhead section of a transmitted frame; and
- 10 a receiver with a frame receiver including an overhead receiver having an input to accept commands for selecting the bit error rate of frame synchronization bytes required for synchronizing the received frame, the overhead receiver synchronizing the frame in response to recognizing the frame synchronization bytes.

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